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TEACHER'S SKILLS AND UTILIZATION OF ICT MATERIALS FOR INSTRUCTIONAL DELIVERY IN PUBLIC SENIOR SECONDARY SCHOOLS IN PORT HARCOURT METROPOLIS

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Abstract

The study examined teachers' skills and utilisation of ICT materials for instructional delivery in public senior secondary schools in Port Harcourt metropolis. In line with the aim of the study, two objectives, two research questions and two hypotheses were formulated to guide the study. The study adopted a descriptive survey design. The population of the study consisted of 3,577 senior secondary school teachers in Port Harcourt metropolis. Taro Yamani statistical formula was used to select a sample size of 360 teachers to represent the entire population. The instrument for data collection was Teachers' Skills and Utilization of ICT Materials for Instructional Delivery Questionnaire (TSUICTMIDQ). The instrument was validated by experts and a reliability coefficient of 0.87 was derived using Cronbach alpha reliability statistics. Mean and standard deviation were used to answer the research questions while independent sample t-test statistics was used to test the research hypotheses at 0.05 level of significance. Findings of this study indicated that teachers' access to ICT materials enhances instructional delivery, 80% of teachers in public senior secondary schools in Port Harcourt metropolis can operate a computer system and teachers are at the advanced level of ICT utilization during instructional delivery in public secondary schools in Port Harcourt metropolis. Based on the findings, the study recommended amongst others that government should implement thorough ICT training programs for teachers in Port Harcourt metropolis to enhance their skills in utilizing digital tools effectively. Also, government should ensure that schools have the necessary ICT infrastructures, including reliable internet access, computers, and software to enhance effective utilisation of ICT materials for instructional delivery as well as provide financial incentives for teachers who complete advanced ICT training programme.

Keywords: Teachers' skills, ICT materials, utilisation, instructional delivery

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Introduction

The advent of information and communication technology (ICT) has made the world a more linked global community. For some years, educational institutions across all sectors have prioritised the use of information and communication technology (ICT) in teaching, learning, research, information dissemination, and management activities. In Nigeria, there has been a noticeable increase in the use of ICT in education. Institutions around the country are researching ways to integrate information and communication technologies into all aspects of education. The OECD (2011) emphasises the use of ICT as an essential instrument for improving the quality of teaching and learning.

Gates (2016) says that digitizing information is critical to meeting future demands. Building on this, Garcia and Lee (2022) discuss how technology has increased learning opportunities and productivity, emphasizing the importance of integrating technological competencies into educational curricula and student training. The use of Information and Communication Technology (ICT) in instructional delivery is critical for meeting educational goals and enhancing teaching quality across disciplines. As information and communication technology (ICT) penetrates daily life and drives information-based operations, computer literacy and technological competency have become essential skills for all populations. As a result, schools must be appropriately equipped with ICT infrastructure to enable access, use, and skill learning.

Bataineh (2013) emphasizes the significance of ongoing teacher training to ensure that technology use aligns with curriculum goals, which is backed by adequate classroom hardware. However, effective ICT integration requires ongoing support and peer mentoring. ICT provides personalized learning by tailoring content to students' various backgrounds and requirements (Fisher, 2001). Modern ICT includes hardware, software, multimedia, and delivery systems. Its applications in education include a wide range of technologies such as computers, digital cameras, networking tools, cloud computing, and internet-based platforms. UNESCO (2008) divides ICT into two categories: conventional (radio, television, landline telephone) and emerging (computers, wireless technologies, satellite, and internet). As Adedeji (2011) points out, ICT includes tools for processing, storing, disseminating, and sharing information.

Mandah (2023) opined that ICT include all the technologies, both old and new, that human have used throughout history to gather data, store data, process data, and disseminate information. Adedeji (2014) further stated that ICT is a generic term that refers to technologies used for collecting, storing, editing and passing on information in various forms to various destinations. It also includes applications such as word processors, spreadsheets, tutorials, simulations, email, digital libraries, computer-mediated conferencing, video conferencing, virtual environments, simulators, emulators, among others.

Recently, the facilitation of communication and broadening of learners' knowledge has been achieved through the development of microcomputers, optical discs, the establishment of telecommunication networks, television, internet, among others (Ziden 2011). It is important to note that newer ICT is being integrated with older technologies, ensuring the continuous use of existing resources and services. Research studies indicate that many teachers do not fully capitalise on the potential of ICT to enhance the learning environment, despite recognising its significant value (Smeets, 2015). Harris (2013) suggests that the benefits of ICT can be realised when confident teachers are willing to embrace new opportunities to transform their classroom practices using ICT materials. The necessity for using ICT

materials in the instructional delivery process in secondary schools cannot be overemphasised.

Instructional delivery is the act of sending information and procedures to the receiver so that they can understand and follow them (Merriam, 2019). It indicates that instructional delivery is the process by which the teacher (instructor) carefully chooses the approach and technique for passing on learning experiences to students through acceptable modes of communication. In the context of this study, instructional delivery refers to the preparation and delivery of learning experiences to secondary school students. Several years ago, namely in the late twentieth and early twenty-first centuries, technology breakthroughs altered the face of instructional delivery. ICT has gained popularity in the instructional delivery (teaching and learning) process in educational institutions, especially secondary schools (United Nations Educational, Scientific and Cultural Organisation [UNESCO], 2008).

Utilisation, according to Raghu as described in Asogwa (2013), is the fundamental way for measuring asset performance and determining business. It is the conversion of a collection of inputs into goods or services, hence adding value to the accessible items as needed by an individual. Thus, the use of ICT refers to the presentation and dissemination of instructional content via electronic devices (e-teaching) to assist learning and communication (Yusuf, 2011).

Utilisation of ICT materials refers to the use of communication technologies to distribute content and solicit feedback from learners to achieve the content's primary goal (Achuonye, 2014).

In the context of this study, utilisation refers to how frequently or regularly teachers use available ICT materials to facilitate the instructional delivery of topic knowledge to students. One factor is that ICT facilities are available; another is that they are functioning; and finally, teachers are efficient in using them to improve the teaching and learning of a subject. To enhance means to increase value, quality, and desirability (Merriam, 2019). An enhanced instructional delivery, therefore, refers to improved techniques of preparing and presenting learning experiences by the teachers and utilising resources that are in tune with global best practices.

Instructional delivery refers to the methods and procedures used by teachers to convey information, interest students in learning, and help them understand the subject matter. It includes the many approaches, tools, and technology used to successfully convey knowledge and promote meaningful learning experiences (Al-Bataineh and Brooks, 2013). Instructional delivery entails using technology to align with the curriculum's philosophy and learning theory, as well as providing proper teacher training and access to relevant tools and resources. The authors underline the importance of continual training for instructors in order to confidently integrate technology into their teaching methods.

Furthermore, secondary education in Nigeria is the level of education designed to prepare youngsters for easy transition into university and the workplace for those who will complete their education at the secondary level. It aims to develop a child beyond the primary level, as elementary education is clearly insufficient for children to learn literacy, numeracy, and communication abilities (Ige, 2011). Aside from functioning as a link between elementary and postsecondary education, it also allows a child to gain more knowledge, skills, and characteristics beyond the primary level. In view of the foregoing, secondary school prepares

children for productive lives in society and higher education. This study focuses on public secondary education.

Public secondary education is a system of education offered by governmental or public institutions to students in the secondary stage, which typically includes grades 9 through 12 or 10 through 12, depending on the country. The government funds and operates public secondary schools, guaranteeing that all students within a given jurisdiction have access to education. Public secondary schools aim to provide a comprehensive curriculum that includes subjects such as mathematics, science, language arts, social studies, physical education, and electives. The curriculum is intended to offer pupils with a well-rounded education that will prepare them for future schooling, professional prospects, and adulthood.

Students in public secondary schools are often expected to adhere to a specific curriculum and satisfy certain academic criteria. They may be able to select elective courses depending on their personal interests or future professional ambitions. Outside of the classroom, public secondary education provides possibilities for personal and social growth through extracurricular activities. Public secondary schools are often open to all students in a given geographic area or district, with no discrimination based on gender, ethnicity, or socioeconomic status. They are sponsored by taxes and government grants and strive to provide free education to all students, regardless of socioeconomic conditions. It is crucial to remember that the structure, curriculum, and policies of public secondary education may differ from one country to the next, as education systems are shaped by cultural, social, and political elements unique to each jurisdiction.

Statement of the Problem

The incorporation of information and communication technology (ICT) elements into instructional delivery is becoming increasingly crucial in modern education. It is difficult to deny the importance of ICT in education and the world at large. The utilization of ICT materials can improve teaching and learning results, increase student engagement and motivation, and provide students with vital skills for the digital age. The Rivers State government has taken a proactive approach by rebuilding secondary schools and equipping them with the required ICT equipment, allowing teachers to serve public secondary school pupils and utilize the potential of ICT. However, the efficient use of ICT tools in these public secondary schools for instructional delivery is heavily dependent on instructors' abilities and knowledge. To what extent do these teachers use ICT materials for instructional delivery? To what extent can these teachers use the internet for successful instruction? These and many other questions serve as the foundation for this investigation.

Aim and Objectives of the Study

The study investigated teachers' skills and utilization of ICT materials for instructional delivery in public Secondary Schools in Port Harcourt metropolis. In specific terms, this study ought to:

1. examine the extent to which public secondary school teachers' access to ICT materials enhances instructional delivery.
2. determine the percentage of teachers in public secondary schools within the Port Harcourt metropolis who are proficient in operating a computer system.

Research Questions

The following research questions were raised to guide the study:

1. To what extent does public secondary school teachers' access to ICT materials enhance instructional delivery?
2. What percentage of teachers in public secondary schools within the Port Harcourt metropolis can operate a computer system?

Hypotheses

The following null hypotheses were formulated to guide the study:

H01: There is no significant difference between the mean ratings of male and female teachers on the extent teachers' access ICT materials to enhance instructional delivery in public secondary schools within the Port Harcourt metropolis.

H02: There is no significant difference between the mean ratings of male and female teachers on the percentage of teachers in public secondary schools within the Port Harcourt metropolis who can operate a computer system.

Methods and Materials

This study adopted a descriptive survey research design, deemed appropriate due to its effectiveness in identifying attributes of a large population from a sample group. The design was suitable as the study examined teachers' skills and utilization of ICT materials for instructional delivery in public secondary schools within the Port Harcourt metropolis, Rivers State. The population comprised 3,577 public senior secondary school teachers in Port Harcourt metropolis, derived from the total number of senior secondary schools across the eight Local Government Areas (LGAs) that constitute the metropolis. Using the Taro Yamane statistical formula, a sample size of 360 teachers was selected to represent the entire population in Port Harcourt city and Obio/Akpor LGA. The instrument for data collection was a questionnaire titled Teachers' Skills and Utilization of ICT Materials for Instructional Delivery in Public Senior Secondary Schools Questionnaire (TSUICTMIDPSSSQ). The instrument consisted of Sections A and B. Section A gathered respondents' biodata, while Section B contained 25 items structured on a modified Likert scale: Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1. To ensure validity, copies of the instrument were reviewed by three experts. A reliability coefficient of 0.87 was obtained using Cronbach's alpha, indicating acceptable reliability for the study. A total of 360 copies of the questionnaire were administered by the researcher, assisted by two trained research assistants. Of these, 340 copies were retrieved and used for data analysis. The collected data were organized in tables, coded, and analyzed using the SPSS software package. Mean and standard deviation were used to answer the research questions, while independent sample t-tests were employed to test the null hypotheses at a 0.05 level of significance. The decision rule for interpreting mean scores was based on real limits: 3.50–4.00 = Strongly Agree, 2.50–3.49 = Agree, 1.50–2.49 = Disagree, and 0.50–1.49 = Strongly Disagree. In hypothesis testing, null hypotheses were accepted if the significance value (Sig.) was greater than the p-value of 0.05, and rejected if Sig. was less than the p-value.

Results and Findings

Research Question 1: To what extent does public secondary school teachers' access to ICT materials enhance instructional delivery?

Table 1: Mean ratings of respondents on the extent public secondary school teachers' access to ICT materials enhances instructional delivery

	N=340	Mean $\bar{X}$	Std	Dec
Teacher's access to computers enhances instructional delivery.		3.64	.78	SA
Teacher's access to electronic smart boards enhances instructional delivery.		3.71	.71	SA
Teacher's access to e-learning platforms enhances instructional delivery.		3.85	.37	SA
Teacher's access to projectors enhances instructional delivery.		3.66	.78	SA
Teacher's access to video conferencing tools enhances instructional delivery.		3.83	.46	SA
Grand Mean		**3.74**	**0.62**	**SA**

$\bar{X}$= Mean; Std= Standard Deviation; Dec = Decision. SA=Strongly Agree, A=Agree, D=Disagree and SD=Strongly Disagree; N=No. of Respondents

Table 1 displays the mean evaluations of respondents on the extent to which public secondary school teachers' access to ICT materials improves instruction delivery. Item 1 had a mean score of 3.64 and a standard deviation of 0.78. This suggests that respondents strongly agreed that instructors' access to computers improves educational delivery. Item 2 got a mean score of 3.71 and a standard deviation of 0.71. This suggests that respondents highly agreed that teachers' access to electronic smart boards improves instructional delivery. Item 3 had a mean score of 3.85 and a standard deviation of 0.37. This suggests that respondents highly agreed that teachers' access to e-learning platforms improves instructional delivery. Item 4 got a mean score of 3.66 and a standard deviation of 0.78. This suggests that respondents strongly agreed that instructors' access to projectors improves educational delivery. Item 5 had a mean score of 3.83 and a standard deviation of 0.46. This indicates that the respondents strongly agreed that teachers' access to video conferencing tools improves educational delivery. The grand mean and standard deviation values of 3.74 and .62, respectively, indicate that, in the judgment of the respondents, teachers' access to computers significantly improves instructional delivery in public secondary schools in the Port Harcourt metropolis.

Research Question 2: What percentage of teachers in public secondary schools within the Port Harcourt metropolis can operate a computer system?

Table 2: Mean ratings of respondents on the percentage of teachers in public secondary schools within the Port Harcourt metropolis who can operate a computer system

	N=340	Mean $\bar{X}$	Std	Dec
20% of teachers in public secondary schools in Port Harcourt metropolis can operate a computer system.		3.57	.56	SA
40% of teachers in public secondary schools in Port Harcourt metropolis can operate a computer system.		3.61	.51	SA
60% of teachers in public secondary schools in Port Harcourt metropolis can operate a computer system.		3.90	.49	SA
80% of teachers in public secondary schools in Port Harcourt metropolis can operate a computer system.		3.95	.40	SA
100% of teachers in public secondary schools in Port Harcourt metropolis can operate a computer system.		3.96	.37	SA
Grand Mean		**3.80**	**0.46**	**SA**

$\bar{X}$= Mean; Std= Standard Deviation; Dec = Decision. SA=Strongly Agree, A=Agree, D=Disagree and SD=Strongly Disagree; N=No. of Respondents

Table 2 indicates respondents' mean ratings of the percentage of instructors in public secondary schools in the Port Harcourt metropolis who can use a computer system. Item 1 had a mean score of 3.57 and a standard deviation of 0.76. This suggests that respondents strongly agreed that 20% of instructors in public secondary schools in the Port Harcourt metropolis can use a computer system. Item 2 had mean and standard deviation scores of 3.61 and .51, respectively. This means that respondents strongly agreed that 40% of teachers in public secondary schools in the Port Harcourt metropolis can use a computer system. Item 3 had a mean score of 3.90 and a standard deviation of 0.49. This means that respondents strongly agreed that 60% of instructors in public secondary schools in the Port Harcourt metropolis can use a computer system. Item 4 received an average score of 3.95 and a standard deviation of 0.40. This signifies that respondents strongly agreed with the assertion that 80% of teachers in public secondary schools in the Port Harcourt metropolitan area can use a computer. Item 5 had an average score of 3.96 and a standard deviation of 0.37. This signifies that respondents strongly agreed that all instructors in public secondary schools in the Port Harcourt metropolis area can use a computer system. Respondents estimate that 80% of instructors in public secondary schools in Port Harcourt can operate a computer system, based on grand mean and standard deviation values of 3.80 and .46, respectively.

$H0_1$: There is no significant difference between the mean ratings of male and female teachers on the extent teachers' access to ICT materials enhances instructional delivery in public secondary schools within the Port Harcourt metropolis.

Table 3: Summary of t-test analysis result on the significant difference between male and female teachers on the extent teachers' access to ICT materials enhances instructional delivery in public secondary schools within the Port Harcourt metropolis

Teachers	n	$\bar{X}$	Std.	df	Sig. 2-(tailed)	t	Decision
Male	200	18.04	2.94	338	.330	0.05	No Significant difference
Female	140	19.65	2.68				

P-Value at 0.05 level of Significance

Table 3 summarizes the t-test analysis results of male and female teachers on how teachers' access to ICT materials improves instructional delivery in public secondary schools in the Port Harcourt metropolitan. It shows that the Sig. (2-tailed) of (.330) is greater than (>) the p-value of 0.05 at df 338. The null hypothesis was so accepted. This means that there is no significant difference in the mean assessments of male and female teachers on how much teachers' access to ICT materials improves instructional delivery in public secondary schools in the Port Harcourt metropolis. This finding is backed by Flex (2014), who believes that teachers who have access to ICT materials can improve instructional delivery by providing various learning resources, encouraging interactive teaching methods, promoting self-directed learning, and preparing students for the digital age. Thus, teachers' access to ICT materials improves instructional delivery in public secondary schools in the Port Harcourt metropolis. Other supporting works include Inyiama (2010), Ochi-Okorie (2015), and Mandah (2016).

$H0_2$. There is no significant difference between the mean ratings of male and female teachers on the percentage of teachers who can operate a computer system within the Port Harcourt metropolis.

Table 4: Summary of t-test analysis result on the significant difference between male and female teachers on the percentage of teachers who can operate a computer system within the Port Harcourt metropolis

Teachers	n	$\bar{X}$	Std.	df	Sig. 2-(tailed)	t	Decision
Male	200	17.79	3.09	388	.450	0.05	No Significant difference
Female	140	18.82	2.99				

P-Value at 0.05 level of Significance

Table 4 summarises the t-test analysis results of male and female instructors on the percentage of teachers who can use a computer system in the Port Harcourt metropolis. It shows that the Sig. (2-tailed) of (.450) is greater than (>) p-value of 0.05 at df 338. The null hypothesis was accepted. As a result, it is established that there is no significant difference in the mean ratings of male and female instructors for the percentage of teachers who can operate a computer system in the Port Harcourt metropolis. This conclusion is consistent with the findings of Andreas and Haenlein (2019), Flex (2022), Henry (2018), and Yusuf (2005),

which suggest that a high percentage of teachers proficient in operating computer systems brings several advantages, including improved instructional quality through digital resources, enhanced communication between teachers and students, streamlined administrative tasks, and better preparation of students for the demands of a technologically advanced. As a result, a large percentage of instructors who can use a computer improve instructional delivery in public secondary schools in the Port Harcourt metropolis.

Discussion of Findings

The study's findings revealed that teachers' access to computers significantly improves instructional delivery in public secondary schools in the Port Harcourt metropolitan. According to the respondents, teachers' access to computers, electronic smart boards, e-learning platforms, projectors, and video conferencing tools all improve instructional delivery. The data also revealed no significant difference in the mean assessments of male and female instructors about the extent to which teachers' access to computers improves instructional delivery in public secondary schools in the Port Harcourt metropolis. Flex (2014) supports this conclusion, stating that teachers who have access to ICT materials can improve instructional delivery by providing different learning resources, encouraging interactive teaching approaches, promoting self-directed learning, and preparing students for the digital age. According to Inyiama (2010), teachers can use a variety of multimedia tools, interactive simulations, and internet resources to expand their instructional content and accommodate different learning styles. According to Ochi-Okorie (2015), ICT materials allow teachers to use interactive and dynamic teaching methods, such as multimedia presentations, collaborative projects, and online discussions, to increase student engagement. According to Mandah (2016), using ICT allows teachers to adjust education to individual student needs, delivering adaptive learning experiences and targeted interventions to suit diverse learning paces and preferences.

The study's findings revealed the percentage of instructors in public secondary schools in the Port Harcourt metropolitan area that can use a computer system. Respondents agreed that 80% of teachers in public secondary schools in the Port Harcourt metropolis can use a computer system. Teachers who are proficient with computer operations can use technology to improve instructional delivery. They can employ multimedia resources, web tools, and educational software to make their lessons more engaging and interactive. The usage of computers allows for a variety of teaching approaches that cater to different learning types. This can result in enhanced student engagement as classes become more dynamic and linked with current teaching methods. Equipping instructors with technological skills helps pupils prepare for the digital age.

The data also revealed that there was no significant difference in mean evaluations of male and female instructors for the percentage of teachers in public secondary schools in the Port Harcourt metropolis who can run a computer system. According to Yusuf (2005), having a high percentage of teachers who can operate computer systems provides several benefits, including improved instructional quality through digital resources, improved communication between teachers and students, streamlined administrative tasks, and better preparation of students for the demands of a technologically advanced society. Andreas and Haenlein (2019) demonstrate that teachers who are skilled at operating computer systems can seamlessly integrate technology into their lessons, improving instructional methods and making learning more engaging. Flex (2022) confirms that computer literacy among teachers accelerates administrative duties such as grading, lesson planning, and communication, resulting in more efficient use of time and resources. According to Henry (2018), teachers who have computer

skills can interact more successfully with colleagues by sharing resources, working on projects, and participating in professional development opportunities enabled by digital platforms.

Conclusion

These findings highlight the necessity of providing instructors with appropriate ICT skills and tools in order to improve instructional effectiveness. The study adds to the larger discussion on educational technology integration and provides useful insights for policymakers, educators, and stakeholders interested in improving teaching and learning outcomes in secondary education.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are proffered:

1. Government should implement thorough ICT training programs for teachers in Port Harcourt metropolis to enhance their skills in utilising digital tools effectively.

2. Government should ensure that schools have the necessary ICT infrastructure, including reliable internet access, computers, and software to support effective utilization by teachers.

3. Government should provide financial incentives for teachers who complete advanced ICT training programs.

4. Government should conduct regular surveys to assess teachers' ICT needs and preferences.

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